

SEQUENCE LISTING

<110> Genentech, Inc.
FUNG, Sek Chung
SINGH, Sanjaya
HUANG, Dan
Moyle, Matthew
LU, Mason
YAN, Changning

<120> Anti-IL13 Antibodies and Uses Thereof

<130> 12279-187-999

<140> 10/583,927

<141> 2009-01-29

<150> 60/532,130

<151> 2003-12-23

<160> 193

<170> PatentIn version 3.2

<210> 1

<211> 114

<212> PRT

<213> Homo sapiens

<400> 1

Ser Pro Gly Pro Val Pro Pro Ser Thr Ala Leu Arg Glu Leu Ile Glu
1 5 10 15

Glu Leu Val Asn Ile Thr Gln Asn Gln Lys Ala Pro Leu Cys Asn Gly
20 25 30

Ser Met Val Trp Ser Ile Asn Leu Thr Ala Gly Met Tyr Cys Ala Ala
35 40 45

Leu Glu Ser Leu Ile Asn Val Ser Gly Cys Ser Ala Ile Glu Lys Thr
50 55 60

Gln Arg Met Leu Ser Gly Phe Cys Pro His Lys Val Ser Ala Gly Gln
65 70 75 80

Phe Ser Ser Leu His Val Arg Asp Thr Lys Ile Glu Val Ala Gln Phe
85 90 95

Val Lys Asp Leu Leu His Leu Lys Lys Leu Phe Arg Glu Gly Arg
100 105 110

Phe Asn

<210> 2
<211> 114
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (13)..(13)
<223> Xaa can be any naturally occurring amino acid

<400> 2

Ser Pro Gly Pro Val Pro Pro Ser Thr Ala Leu Arg Xaa Leu Ile Glu
1 5 10 15

Glu Leu Val Asn Ile Thr Gln Asn Gln Lys Ala Pro Leu Cys Asn Gly
20 25 30

Ser Met Val Trp Ser Ile Asn Leu Thr Ala Gly Met Tyr Cys Ala Ala
35 40 45

Leu Glu Ser Leu Ile Asn Val Ser Gly Cys Ser Ala Ile Glu Lys Thr
50 55 60

Gln Arg Met Leu Ser Gly Phe Cys Pro His Lys Val Ser Ala Gly Gln
65 70 75 80

Phe Ser Ser Leu His Val Arg Asp Thr Lys Ile Glu Val Ala Gln Phe
85 90 95

Val Lys Asp Leu Leu Leu His Leu Lys Lys Leu Phe Arg Glu Gly Arg
100 105 110

Phe Asn

<210> 3
<211> 113
<212> PRT
<213> Murinae gen. sp.

<220>
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<222> (1)..(113)
<223> VARIABLE REGION OF LIGHT CHAIN OF MONOCLONAL ANTIBODY 228B/C
<400> 3

Asn Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Asn Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Ala
50 55 60

Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr Leu Thr Ile Asp
65 70 75 80

Pro Val Glu Ala Asp Asp Ala Ala Ser Tyr Tyr Cys Gln Gln Asn Asn
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Thr Lys Leu Glu Ile Lys Arg
100 105 110

Ala

<210> 4
<211> 118
<212> PRT
<213> Murinae gen. sp.

<220>
<221> CHAIN
<222> (1)..(118)
<223> VARIABLE REGION OF HEAVY CHAIN OF MONOCLONAL ANTIBODY 228B/C

<400> 4

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1 5 10 15

Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Leu Asn Ala Tyr
20 25 30

Ser Val Asn Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu
35 40 45

Gly Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Asn Ile Ser Lys Asp Ser Ser Lys Ser Gln Val Phe Leu
65 70 75 80

Lys Met Ser Ser Leu Gln Ser Asp Asp Thr Ala Arg Tyr Tyr Cys Ala
85 90 95

Gly Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly His Gly Thr
100 105 110

Ser Val Thr Val Ser Ser
115

<210> 5
<211> 118
<212> PRT
<213> Murinae gen. sp.

<220>
<221> CHAIN
<222> (1)..(118)
<223> VARIABLE REGION OF LIGHT CHAIN OF MONOCLONAL ANTIBODY 228A-4

<400> 5

Gln Val Gln Leu Lys Glu Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1 5 10 15

Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Leu Thr Asp Tyr
20 25 30

Asn Ile Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu
35 40 45

Gly Met Ile Trp Gly Asp Gly Ser Thr Ala Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Ser Ile Ser Lys Asp Asn Ser Lys Ser Gln Ile Phe Leu
65 70 75 80

Lys Met Asn Ser Leu Gln Thr Glu Asp Thr Ala Arg Tyr Tyr Cys Ala
85 90 95

Arg Asp Gly Tyr Phe Pro Tyr Ala Met Ala Tyr Trp Gly Gln Gly Thr
100 105 110

Ser Val Thr Val Ser Ser
115

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<223> VARIABLE REGION OF HEAVY CHAIN OF MONOCLONAL ANTIBODY 228A-4

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Gln Val Gln Leu Lys Glu Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1 5 10 15

Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Leu Thr Asp Tyr
20 25 30

Asn Ile Asn Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu
35 40 45

Gly Met Ile Trp Gly Asp Gly Ser Thr Ala Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Ser Ile Ser Lys Asp Asn Ser Lys Ser Gln Ile Phe Leu
65 70 75 80

Lys Met Asn Ser Leu Gln Thr Glu Asp Thr Ala Arg Tyr Tyr Cys Ala
85 90 95

Arg Asp Gly Tyr Phe Pro Tyr Ala Met Ala Tyr Trp Gly Gln Gly Thr
100 105 110

Ser Val Thr Val Ser Ser
115

<210> 7
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<222> (1)..(114)
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<220>
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<222> (1)..(114)
<223> VARIABLE REGION OF LIGHT CHAIN OF MONOCLONAL ANTIBODY 227-26-1

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Asp Val Leu Met Thr Gln Thr Pro Leu Ser Leu Pro Val Ser Leu Gly
1 5 10 15

Asp Gln Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Ile Val His Ser
20 25 30

Asn Gly Asn Thr Tyr Leu Gln Trp Tyr Leu Gln Lys Pro Gly Gln Ser
35 40 45

Pro Lys Leu Leu Ile Tyr Lys Val Ser Asn Arg Phe Ser Gly Val Pro
50 55 60

Asp Arg Phe Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65 70 75 80

Ser Arg Val Glu Ala Glu Asp Leu Gly Val Tyr Tyr Cys Phe Gln Gly
85 90 95

Ser His Val Pro Tyr Thr Phe Gly Gly Thr Lys Leu Glu Ile Lys
100 105 110

Arg Ala

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<222> (1)..(120)
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Gln Val Gln Leu Gln Gln Ser Gly Asp Asp Leu Val Leu Pro Gly Ala
1 5 10 15

Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
20 25 30

Trp Ile Asn Trp Ile Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly His Ile Ala Pro Gly Ser Gly Ser Thr Tyr Phe Asn Glu Met Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Thr Ser Ser Ser Thr Ala Tyr
65 70 75 80

Ile Gln Leu Ser Ser Leu Ser Ser Glu Asp Ser Ala Val Tyr Phe Cys

85

90

95

Ala Arg Ser Asp Ile Phe Leu Ser Tyr Ala Met Asp Tyr Trp Gly Gln
100 105 110

Gly Thr Ser Val Thr Val Ser Ser
115 120

<210> 9
<211> 50
<212> DNA
<213> ARTIFICIAL SEQUENCE

<220>
<223> Forward oligonucleotide primer for a mutant IL13 sequence

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aagctttccc caggccctgt gcctccctct acagccctca ggaagctcat 50

<210> 10
<211> 30
<212> DNA
<213> ARTIFICIAL SEQUENCE

<220>
<223> Reverse Oligo nucleotide primer of a mutant IL13 sequence

<400> 10
ctcgagggtt aaccgtccct cgcgaaaaag 30

<210> 11
<211> 22
<212> DNA
<213> ARTIFICIAL SEQUENCE

<220>
<223> Forward degenerate oligonucleotide primer for monkey IL13

<400> 11
gyyctrggcy ycatggcgct yt 22

<210> 12
<211> 25
<212> DNA
<213> ARTIFICIAL SEQUENCE

<220>
<223> Reverse degenerate oligonucleotide primer for monkey IL13

<400> 12
tttcagttga accgtccyty gcgaa 25

<210> 13
<211> 399
<212> DNA

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<213> Macaca fascicularis

<400> 13
atggcgctct tggaccat gtcattgct ctcacttgcc tcggcggctt tgcctcccc 60
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cagaaccaga aggccccgct ctgcaatggc agcatggtgt ggagcatcaa cctgacagct 180
ggcgtgtact gtgcagccct ggaatccctg atcaacgtgt caggctgcag tgccatcgag 240
aagacccaga ggtatgctgaa cggattctgc ccgcacaagg tctcagctgg gcagtttcc 300
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<210> 14
<211> 34
<212> DNA
<213> ARTIFICIAL SEQUENCE

<220>
<223> Forward oligonucleotide primer for cynomologus monkey IL13

<400> 14
aagcttcacc atggcgctct tggaccat ggtc 34

<210> 15
<211> 40
<212> DNA
<213> ARTIFICIAL SEQUENCE

<220>
<223> Reverse oligonucleotide primer for cynomologus monkey IL13

<400> 15
tcacaagatc tgggctcctc gaggttgaac cgtccattgc 40

<210> 16
<211> 23
<212> DNA
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<220>
<223> Forward oligonucleotide primer for Fc gammal

<400> 16
ctcgaggagc ccagatctt tga 23

<210> 17
<211> 35
<212> DNA
<213> ARTIFICIAL SEQUENCE

<220>
<223> Reverse oligonucleotide primer for Fc gamma 1

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<400> 17
gctctagagc ctcatttacc cggagacagg gagag

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<210> 18
<211> 8
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<220>
<223>, EPITOPE BINDING SITE

<400> 18

Glu Ser Leu Ile Asn Val Ser Gly
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<210> 19
<211> 12
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> EPITOPE BINDING SITE

<400> 19

Tyr Cys Ala Ala Leu Glu Ser Leu Ile Asn Val Ser
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<210> 20
<211> 23
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRL1 228B/C-1

<400> 20

Asn Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Gln Arg Ala Thr Ile Ser Cys
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<210> 21
<211> 23
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<213> ARTIFICIAL SEQUENCE

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Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
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<210> 22
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<220>
<223> FRL1 VARIANT B

<400> 22

Asp Ile Val Met Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
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<210> 23
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<212> PRT
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<220>
<223> FRL1 VARIANT J

<400> 23

Asp Ile Val Leu Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
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<210> 24
<211> 23
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<220>
<223> FRL1 VARIANT L

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Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
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<210> 25
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<400> 25

Asp Ile Val Leu Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
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<210> 26
<211> 23
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRL1 VARIANT HT2-DP27 #29

<400> 26

Asp Ile Val Leu Thr Gln Ser Pro Val Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
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<210> 27
<211> 23
<212> PRT
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<220>
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Asp Ile Val Met Thr Gln Ser Pro Ala Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
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<210> 28
<211> 23
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRL1 VARIANT HT2-DP27 #66

<400> 28

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys
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<210> 29
<211> 15
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRL2 228B/C

<400> 29

Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr
1 5 10 15

<210> 30
<211> 32
<212> PRT
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<220>
<223> FRL3 288 B/C

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Gly Val Pro Ala Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Val Glu Ala Asp Asp Ala Ala Ser Tyr Tyr Cys
20 25 30

<210> 31
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<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRL3 HT2

<400> 31

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 32
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRL3 VARIANT B

<400> 32

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 33
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRL3 VARIANT J

<400> 33

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 34
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
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<210> 35
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<212> PRT
<213> ARTIFICIAL SEQUENCE

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<223> FRL3 VARIANT N

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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
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<210> 36
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<212> PRT
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<400> 36

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Ser Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 37
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
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<400> 37

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 38
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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 39
<211> 32

<212> PRT
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<223> FRL3 VARIANT HT2-NEW #9

<400> 39

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 40
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<212> PRT
<213> ARTIFICIAL SEQUENCE

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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
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<210> 41
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<213> ARTIFICIAL SEQUENCE

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<223> FRL3 HT2-NEW #21

<400> 41

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 42
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRL3 VARIANT HT2-NEW # 67

<400> 42

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 43
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<212> PRT
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<223> FRL3 VARIANT HT2-NEW #74

<400> 43

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 44
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<213> ARTIFICIAL SEQUENCE

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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Ser Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 45
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<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRL3 VARIANT HT2-NEW #322

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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Ser Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 46
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 47
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Ser Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 48
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 49
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
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Leu Thr Ile Asp Pro Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
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<210> 50

<211> 32

<212> PRT

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<220>

<223> FRL3 VARIANT HT2-DP27 #92

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1 5 10 15

Leu Thr Ile Asp Thr Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
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<211> 32

<212> PRT

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<223> FRL3 VARIANT HT2-DP27 #118

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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Pro Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 52

<211> 32

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> FRL3 VARIANT HT2-DP27 #123

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1 5 10 15

Leu Thr Ile Ser Ser Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 53
<211> 32
<212> PRT
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<400> 53

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Asp Pro Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 54
<211> 32
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<213> ARTIFICIAL SEQUENCE

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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 55
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<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15

Leu Thr Ile Ser Ser Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 56
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<223> FRL3 VARIANT HT2-DP27 #301

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1 5 10 15

Leu Thr Ile Ser Pro Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
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<210> 57

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<223> FRL4 228 B/C

<400> 57

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<210> 58

<211> 11

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<223> FRL4 HT2

<400> 58

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
1 5 10

<210> 59

<211> 11

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<400> 59

Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
1 5 10

<210> 60

<211> 30

<212> PRT

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<220>

<223> FRH1 228 B/C

<400> 60

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1 5 10 15

Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Leu Asn
20 25 30

<210> 61

<211> 30

<212> PRT

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<223> FRH1 DP27

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Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Ser
20 25 30

<210> 62

<211> 30

<212> PRT

<213> ARTIFICIAL SEQUENCE

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<223> FRH1 NEW

<400> 62

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Arg Pro Ser Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Ser Thr Phe Ser
20 25 30

<210> 63

<211> 30

<212> PRT

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<223> FRH1 VARIANT HT2-NEW #73

<400> 63

Gln Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Arg Pro Ser Gln
1 5 10 15

Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Ser Thr Phe Ser
20 25 30

<210> 64
<211> 30
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH1 HT2-DP27 #7

<400> 64

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Asn
20 25 30

<210> 65
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<212> PRT
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<220>
<223> FRH1 VARIANT HT2-DP27 #40

<400> 65

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Ser
20 25 30

<210> 66
<211> 30
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<220>
<223> FRH1 VARIANT HT2-DP27 #268

<400> 66

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Phe Ser Gly Phe Ser Leu Asn
20 25 30

<210> 67
<211> 14
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>

<223> FRH2 228 B/C

<400> 67

Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu Gly
1 5 10

<210> 68

<211> 14

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> FRH2 DP27

<400> 68

Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu Ala
1 5 10

<210> 69

<211> 14

<212> PRT

<213> ARTIFICIAL SEQUENCE

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<223> FRH2 NEW

<400> 69

Trp Val Arg Gln Pro Pro Gly Arg Gly Leu Glu Trp Ile Gly
1 5 10

<210> 70

<211> 14

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<223> FRH2 VARIANT 1

<400> 70

Trp Val Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu Gly
1 5 10

<210> 71

<211> 14

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> FRH2 VARIANT 3

<400> 71

Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu Gly
1 5 10

<210> 72
<211> 14
<212> PRT
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<220>
<223> FRH2 VARIANT HT2-DP27 #7

<400> 72

Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu Gly
1 5 10

<210> 73
<211> 14
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH2 VARIANT HT2-DP27 # 43

<400> 73

Trp Ile Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu Ala
1 5 10

<210> 74
<211> 14
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH2 VARIANT HT2-DP27 #50

<400> 74

Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Leu Ala
1 5 10

<210> 75
<211> 14
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH2 VARIANT HT2-DP27 #100

<400> 75

Trp Val Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu Ala
1 5 10

<210> 76
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 228 B/C

<400> 76

Arg Leu Asn Ile Ser Lys Asp Ser Ser Lys Ser Gln Val Phe Leu Lys
1 5 10 . 15

Met Ser Ser Leu Gln Ser Asp Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 77
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 DP27

<400> 77

Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Arg
20 25 30

<210> 78
<211> 32
<212> PRT
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<220>
<223> FRH3 NEW

<400> 78

Arg Val Thr Met Leu Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
1 5 10 15

Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Arg
20 25 30

<210> 79
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 VARIANT 1

<400> 79

Arg Leu Thr Ile Ser Lys Asp Ser Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Gly
20 25 30

<210> 80
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 VARIANT 3

<400> 80

Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Gly
20 25 30

<210> 81
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 VARIANT 4

<400> 81

Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 82
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 HT2-NEW #1

<400> 82

Arg Leu Asn Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Phe Leu Arg
1 5 10 15

Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
20 25 30

<210> 83
<211> 32

<212> PRT
<213> ARTIFICIAL SEQUENCE

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<223> FRH3 VARIANT HT2-NEW #9

<400> 83

Arg Leu Asn Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Phe Leu Arg
1 5 10 15

Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 84
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 VARIANT HT2-NEW #14

<400> 84

Arg Val Asn Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
1 5 10 15

Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Arg
20 25 30

<210> 85
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 VARIANT HT2-DP27 #26

<400> 85

Arg Leu Asn Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Arg
20 25 30

<210> 86
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 VARIANT HT2-DP27 #275

<400> 86

Arg Leu Thr Ile Ser Lys Asp Ile Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 87
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 VARIANT HT2-DP27 #301

<400> 87

Arg Leu Asn Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Gly
20 25 30

<210> 88
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 VARIANT HT2-DP27 #580

<400> 88

Arg Leu Asn Ile Ser Lys Asp Ser Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Gly
20 25 30

<210> 89
<211> 32
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH3 VARIANT HT2-DP27 #345

<400> 89

Arg Leu Asn Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala Arg
20 25 30

<210> 90
<211> 32
<212> PRT
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<220>
<223> FRH3 VARIANT HT2-DP27 #634

<400> 90

Arg Leu Thr Ile Ser Lys Asp Ser Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15

Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 91
<211> 11
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> FRH4 228B/C

<400> 91

Trp Gly His Gly Thr Ser Val Thr Val Ser Ser
1 5 10

<210> 92
<211> 11
<212> PRT
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<223> FRH4 DP27

<400> 92

Trp Gly Gln Gly Ser Leu Val Thr Val Ser Ser
1 5 10

<210> 93
<211> 112
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> VARIABLE LIGHT CHAIN OF CL5

<400> 93

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Gln Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Ala
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 94
<211> 118
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> VARIABLE HEAVY CHAIN OF CL5

<400> 94

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Gly Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Lys Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 95
<211> 112
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> VARIABLE LIGHT CHAIN OF CL-13

<400> 95

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Gln Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Asn
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 96
<211> 118
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> VARIABLE HEAVY CHAIN OF CL-13

<400> 96

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Gly Ser Gly Phe Ser Leu Ser Ala Lys
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Ser Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 97
<211> 112
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> VARIABLE LIGHT CHAIN OF CL-50

<400> 97

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Gln Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Ala
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 98
<211> 118
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>

<223> VARIABLE HEAVY CHAIN OF CL-50

<400> 98

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Gly Ser Gly Phe Ser Leu Ser Ala Lys
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Lys Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 99

<211> 15

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-L1 228B/C

<400> 99

Arg Ala Ser Lys Ser Val Asp Ser Tyr Gly Asn Ser Phe Met His
1 5 10 15

<210> 100

<211> 15

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-L1 VARIANT 1

<400> 100

Arg Ala Ser Lys Ser Val Asp Ser Tyr Gly Gln Ser Phe Met His
1 5 10 15

<210> 101
<211> 15
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L1 VARIANT 2

<400> 101

Arg Ala Ser Lys Ser Val Asp Ser Tyr Gly Gln Ser Phe Leu His
1 5 10 15

<210> 102
<211> 15
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L1 VARIANT 3

<400> 102

Arg Ala Ser Lys Ser Val Asp Ser Tyr Gly Asn Ser Tyr Met His
1 5 10 15

<210> 103
<211> 15
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L1 VARIANT 4

<400> 103

Arg Ala Ser Lys Ser Val Asp Ser Tyr Gly Asn Ser Phe Leu His
1 5 10 15

<210> 104
<211> 7
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L2 228B/C

<400> 104

Leu Ala Ser Asn Leu Glu Ser
1 5

<210> 105
<211> 7

<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L2 VARIANT 1

<400> 105

Leu Ala Ser Asn Leu Asn Ser
1 5

<210> 106
<211> 7
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L2 VARIANT 2

<400> 106

Leu Ala Ser Asn Leu Gln Ser
1 5

<210> 107
<211> 7
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L2 VARIANT 3

<400> 107

Leu Ala Thr Asn Leu Glu Ser
1 5

<210> 108
<211> 7
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L2 VARIANT 4

<400> 108

Leu Ala Ser Asn Leu Lys Ser
1 5

<210> 109
<211> 7
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L2 VARIANT 5

<400> 109

Leu Ala Ser Asn Leu Glu Lys
1 5

<210> 110

<211> 7

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-L2 VARIANT 6

<400> 110

Leu Ala Ser Arg Leu Glu Ser
1 5

<210> 111

<211> 7

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-L2 VARIANT 7

<400> 111

Leu Ala Ser Asn Leu His Ser
1 5

<210> 112

<211> 7

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-L2 VARIANT 8

<400> 112

Leu Ala Ser Asn Leu Ser Ser
1 5

<210> 113

<211> 7

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-L2 VARIANT 9

<400> 113

Leu Ala Ser Phe Leu Glu Ser
1 5

<210> 114
<211> 7
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L2 VARIANT 10

<400> 114

Leu Ala Asn Asn Leu Glu Ser
1 5

<210> 115
<211> 9
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L3 228B/C

<400> 115

Gln Gln Asn Asn Glu Asp Pro Arg Thr
1 5

<210> 116
<211> 9
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-L3 VARIANT 1

<400> 116

Gln Gln Asn Ala Glu Asp Pro Arg Thr
1 5

<210> 117
<211> 5
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H1 228B/C

<400> 117

Ala Tyr Ser Val Asn
1 5

<210> 118
<211> 5
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-H1 VARIANT 1

<400> 118

Ala Lys Ser Val Asn
1 5

<210> 119

<211> 5

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-H1 VARIANT 2

<400> 119

Ala Asn Ser Val Asn
1 5

<210> 120

<211> 5

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-H1 VARIANT 3

<400> 120

Gly Tyr Ser Val Asn
1 5

<210> 121

<211> 5

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-H1 VARIANT 4

<400> 121

Ala His Ser Val Asn
1 5

<210> 122

<211> 5

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-H1 VARIANT 5

<400> 122

Ala Arg Ser Val Asn
1 5

<210> 123
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 228B/C

<400> 123

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 124
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 1

<400> 124

Met Ile Trp Gly Asp Gly Lys Ile Ser Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 125
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 2

<400> 125

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Glu Ser
1 5 10 15

<210> 126
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 3

<400> 126

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 127
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 4

<400> 127

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Asp Leu Lys Ser
1 5 10 15

<210> 128
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 5

<400> 128

Met Ile Trp Gly Asp Gly Lys Val Val Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 129
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 6

<400> 129

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Glu Leu Lys Ser
1 5 10 15

<210> 130
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 7

<400> 130

Met Ile Trp Gly Asp Gly Lys Ile Ala Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 131
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 8

<400> 131

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys Glu
1 5 10 15

<210> 132
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 9

<400> 132

Met Val Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 133
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 10

<400> 133

Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Ala Ser
1 5 10 15

<210> 134
<211> 16
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H2 VARIANT 11

<400> 134

Met Ile Trp Gly Asp Gly Lys Lys Val Tyr Asn Ser Ala Leu Lys Ser
1 5 10 15

<210> 135
<211> 10
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H3 228B/C

<400> 135

Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn
1 5 10

<210> 136
<211> 10

<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H3 VARIANT 1

<400> 136

Asp Gly Arg Tyr Pro Tyr Ala Met Asp Asn
1 5 10

<210> 137
<211> 10
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H3 VARIANT 2

<400> 137

Asp Gly Tyr Tyr Pro Tyr Ala Met Lys Asn
1 5 10

<210> 138
<211> 10
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H3 VARIANT 3

<400> 138

Asp Gly Arg Tyr Pro Tyr Ala Met Lys Asn
1 5 10

<210> 139
<211> 10
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H3 VARIANT 4

<400> 139

Asp Gly Tyr Tyr Pro Tyr Ala Met Ser Asn
1 5 10

<210> 140
<211> 10
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> CDR-H3 VARIANT 5

<400> 140

Asp Gly Tyr Tyr Pro Tyr Ala Met Ala Asn
1 5 10

<210> 141

<211> 10

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> CDR-H3 VARIANT 6

<400> 141

Asp Gly Tyr Tyr Pro Tyr Ala Leu Asp Asn
1 5 10

<210> 142

<211> 112

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> VARIABLE LIGHT CHAIN OF CL-89

<400> 142

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Asn Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Asn
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 143

<211> 118

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> VARIABLE HEAVY CHAIN CL-276G

<400> 143

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Gly Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 144

<211> 112

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> VARIABLE LIGHT CHAIN OF RL-36

<400> 144

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Asn Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Asn
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 145

<211> 118

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> VARIABLE HEAVY CHAIN RL-36

<400> 145

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Gly Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 146

<211> 118

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> VARIABLE HEAVY CHAIN RL-19

<400> 146

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Ser Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Leu Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 147

<211> 118

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> VARIABLE HEAVY CHAIN RL-11

<400> 147

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 148
<211> 118
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>
<223> VARIABLE HEAVY CHAIN RL-8

<400> 148

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Leu Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Ser Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 149
<211> 118
<212> PRT
<213> ARTIFICIAL SEQUENCE

<220>

<223> VARIABLE HEAVY CHAIN RL-45

<400> 149

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15 .

Thr Leu Thr Leu Thr Cys Thr Thr Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Thr Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 150

<211> 112

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> VARIABLE LIGHT CHAIN RL-36-L1,59

<400> 150

Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ser Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Arg Ala Ser Lys Ser Val Asp Ser Tyr
20 25 30

Gly Gln Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Asp
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln Asn Asn
85 90 95

Glu Asp Pro Arg Thr Phe Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105 110

<210> 151

<211> 118

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> VARIABLE HEAVY CHAIN RL36-L1, 59

<400> 151

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Gly Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Val Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser
115

<210> 152

<211> 248

<212> PRT

<213> ARTIFICIAL SEQUENCE

<220>

<223> SINGLE CHAIN FV

<400> 152

Gln Val Thr Leu Arg Glu Ser Gly Pro Ala Leu Val Lys Pro Thr Gln
1 5 10 15

Thr Leu Thr Leu Thr Cys Thr Val Ser Gly Phe Ser Leu Ser Ala Tyr
20 25 30

Ser Val Asn Trp Ile Arg Gln Pro Pro Gly Lys Ala Leu Glu Trp Leu
35 40 45

Ala Met Ile Trp Gly Asp Gly Lys Ile Val Tyr Asn Ser Ala Leu Lys
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu
65 70 75 80

Thr Met Thr Asn Met Asp Pro Val Asp Thr Ala Thr Tyr Tyr Cys Ala
85 90 95

Gly Asp Gly Tyr Tyr Pro Tyr Ala Met Asp Asn Trp Gly Gln Gly Ser
100 105 110

Leu Val Thr Val Ser Ser Gly Gly Ser Ser Arg Ser Ser Ser Gly
115 120 125

Gly Gly Gly Ser Gly Gly Gly Asp Ile Val Met Thr Gln Ser Pro
130 135 140

Asp Ser Leu Ser Val Ser Leu Gly Glu Arg Ala Thr Ile Asn Cys Arg
145 150 155 160

Ala Ser Lys Ser Val Asp Ser Tyr Gly Asn Ser Phe Met His Trp Tyr
165 170 175

Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr Leu Ala Ser
180 185 190

Asn Leu Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser Gly
195 200 205

Thr Asp Phe Thr Leu Thr Ile Ser Ser Val Gln Ala Glu Asp Val Ala
210 215 220

Val Tyr Tyr Cys Gln Gln Asn Asn Glu Asp Pro Arg Thr Phe Gly Gly
225 230 235 240

Gly Thr Lys Val Glu Ile Lys Arg
245

<210> 153
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> FRL1 VARIANT N

<400> 153
Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15
Glu Arg Ala Thr Ile Asn Cys
20

<210> 154
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> FRL1 VARIANT HT2-DP27 #118

<400> 154
Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15
Glu Arg Ala Thr Ile Asn Cys
20

<210> 155
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRL3 VARIANT HT2-dp27 #40

<400> 155
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15
Leu Thr Ile Asp Ser Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 156
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRL3 VARIANT HT2-dp27 #26

<400> 156
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15
Leu Thr Ile Asp Pro Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 157
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRL3 VARIANT HT2-dp27 #164

<400> 157
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15
Leu Thr Ile Ser Pro Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 158
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRL3 VARIANT HT2-dp27 #304

<400> 158
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15
Leu Thr Ile Asp Ser Val Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 159
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRL3 VARIANT HT2-dp27 #274

<400> 159
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15
Leu Thr Ile Asp Pro Val Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 160
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRL3 VARIANT HT2-dp27 #530

<400> 160
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15
Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 161
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRL3 VARIANT HT2-dp27 #374

<400> 161
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr
1 5 10 15
Leu Thr Ile Asp Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 162
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRL3 VARIANT HT2-dp27 #610

<400> 162
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15
Leu Thr Ile Asp Ser Leu Glu Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 163
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH2 Variant HT2-NEW #14

<400> 163
Trp Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile Gly
1 5 10

<210> 164
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH2 Variant HT2-NEW #67

<400> 164
Trp Val Arg Gln Pro Pro Gly Arg Gly Leu Glu Trp Leu Gly
1 5 10

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<210> 165
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #17

<400> 165
Arg Leu Asn Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
 1           5           10          15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
 20          25          30

<210> 166
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #65

<400> 166
Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
 1           5           10          15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
 20          25          30

<210> 167
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #67

<400> 167
Arg Val Asn Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
 1           5           10          15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
 20          25          30

<210> 168
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #73

<400> 168
Arg Val Thr Met Leu Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
 1           5           10          15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
 20          25          30

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<210> 169
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #74

<400> 169
Arg Val Thr Ile Leu Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
1 5 10 15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 170
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #78

<400> 170
Arg Val Asn Ile Leu Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
1 5 10 15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
20 25 30

<210> 171
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #275

<400> 171
Arg Val Asn Ile Leu Lys Asp Thr Ser Lys Asn Gln Phe Phe Leu Arg
1 5 10 15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 172
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #284

<400> 172
Arg Leu Ile Ile Ser Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
1 5 10 15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
20 25 30

<210> 173
<211> 32

<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #291

<400> 173
Arg Leu Thr Ile Leu Lys Asp Thr Ser Lys Asn Gln Phe Phe Leu Arg
1 5 10 15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
20 25 30

<210> 174
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #300

<400> 174
Arg Val Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
1 5 10 15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
20 25 30

<210> 175
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #302

<400> 175
Arg Val Asn Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
1 5 10 15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
20 25 30

<210> 176
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> FRH3 Variant HT2-NEW #322

<400> 176
Arg Val Asn Ile Ser Lys Asp Thr Ser Lys Asn Gln Phe Phe Leu Arg
1 5 10 15
Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 177
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
 <223> FRH3 Variant HT2-NEW #111

 <400> 177
 Arg Leu Thr Ile Ser Lys Asp Thr Ser Lys Asn Gln Phe Phe Leu Arg
 1 5 10 15
 Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
 20 25 30

 <210> 178
 <211> 32
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> FRH3 Variant HT2-NEW #162

 <400> 178
 Arg Leu Thr Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
 1 5 10 15
 Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
 20 25 30

 <210> 179
 <211> 32
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> FRH3 Variant HT2-NEW #139

 <400> 179
 Arg Val Thr Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Phe Leu Arg
 1 5 10 15
 Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
 20 25 30

 <210> 180
 <211> 32
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> FRH3 Variant HT2-NEW #177

 <400> 180
 Arg Val Thr Met Ser Lys Asp Thr Ser Lys Asn Gln Phe Ser Leu Arg
 1 5 10 15
 Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Gly
 20 25 30

 <210> 181
 <211> 11
 <212> PRT
 <213> Artificial Sequence

 <220>

<223> FRH4 variant HT2-dp27 #19

<400> 181
Trp Gly His Gly Ser Leu Val Thr Val Ser Ser
1 5 10

<210> 182
<211> 32
<212> PRT
<213> Artificial Sequence

<220>

<223> FRH3 variant HT2-dp27 #19

<400> 182
Arg Leu Asn Ile Ser Lys Asp Ser Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15
Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 183
<211> 32
<212> PRT
<213> Artificial Sequence

<220>

<223> FRH3 variant HT2-dp27 #43

<400> 183
Arg Leu Asn Ile Ser Lys Asp Thr Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15
Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 184
<211> 32
<212> PRT
<213> Artificial Sequence

<220>

<223> FRH3 variant HT2-dp27 #118

<400> 184
Arg Leu Thr Ile Ser Lys Asp Ile Ser Lys Asn Gln Val Val Leu Thr
1 5 10 15
Met Thr Asn Met Asp Pro Val Asp Thr Ala Arg Tyr Tyr Cys Ala Gly
20 25 30

<210> 185
<211> 5
<212> PRT
<213> Artificial Sequence

<220>

<223> CDR-H1 Cl-65 Variant

<400> 185

Ala Ser Ser Val Asn
1 5

<210> 186
<211> 131
<212> PRT
<213> Artificial Sequence

<220>
<223> Majority sequence of aligned IL-13 of various species

<400> 186
Met Ala Leu Trp Leu Thr Ala Val Ile Ala Leu Ala Cys Leu Gly Gly
. 1 5 10 15
Leu Ala Ser Pro Gly Pro Val Pro Pro Ser Thr Ala Leu Lys Glu Leu
20 25 30
Ile Glu Glu Leu Val Asn Ile Thr Gln Asn Gln Lys Ala Pro Leu Cys
35 40 45
Asn Gly Ser Met Val Trp Ser Val Asn Leu Thr Ala Gly Gly Tyr Cys
50 55 60
Ala Ala Leu Glu Ser Leu Ile Asn Ile Ser Gly Cys Ser Ala Ile Gln
65 70 75 80
Arg Thr Gln Arg Met Leu Asn Gly Leu Cys Pro His Lys Ala Ser Ala
85 90 95
Gly Gln Ser Ser Arg Val Arg Asp Thr Lys Ile Glu Val Ala Gln
100 105 110
Phe Val Lys Asp Leu Leu Asn Tyr Ser Lys Gln Leu Phe Arg Asn Gly
115 120 125
Arg Phe Asn
130

<210> 187
<211> 132
<212> PRT
<213> Homo sapiens

<220>
<223> Human interleukin-13 sequence

<400> 187
Met Ala Leu Leu Leu Thr Thr Val Ile Ala Leu Thr Cys Leu Gly Gly
1 5 10 15
Phe Ala Ser Pro Gly Pro Val Pro Pro Ser Thr Ala Leu Arg Glu Leu
20 25 30
Ile Glu Glu Leu Val Asn Ile Thr Gln Asn Gln Lys Ala Pro Leu Cys
35 40 45
Asn Gly Ser Met Val Trp Ser Ile Asn Leu Thr Ala Gly Met Tyr Cys
50 55 60
Ala Ala Leu Glu Ser Leu Ile Asn Val Ser Gly Cys Ser Ala Ile Glu
65 70 75 80
Lys Thr Gln Arg Met Leu Ser Gly Phe Cys Pro His Lys Val Ser Ala
85 90 95
Gly Gln Phe Ser Ser Leu His Val Arg Asp Thr Lys Ile Glu Val Ala
100 105 110
Gln Phe Val Lys Asp Leu Leu Leu His Leu Lys Lys Leu Phe Arg Glu
115 120 125
Gly Arg Phe Asn
130

<210> 188
<211> 132
<212> PRT
<213> Macaque

<220>
<223> Monkey interleukin-13 sequence

<400> 188

Met Ala Leu Leu Leu Thr Met Val Ile Ala Leu Thr Cys Leu Gly Gly			
1	5	10	15
Phe Ala Ser Pro Ser Pro Val Pro Pro Ser Thr Ala Leu Lys Glu Leu			
20	25	30	
Ile Glu Glu Leu Val Asn Ile Thr Gln Asn Gln Lys Ala Pro Leu Cys			
35	40	45	
Asn Gly Ser Met Val Trp Ser Ile Asn Leu Thr Ala Gly Val Tyr Cys			
50	55	60	
Ala Ala Leu Glu Ser Leu Ile Asn Val Ser Gly Cys Ser Ala Ile Glu			
65	70	75	80
Lys Thr Gln Arg Met Leu Asn Gly Phe Cys Pro His Lys Val Ser Ala			
85	90	95	
Gly Gln Phe Ser Ser Leu Arg Val Arg Asp Thr Lys Ile Glu Val Ala			
100	105	110	
Gln Phe Val Lys Asp Leu Leu Val His Leu Lys Lys Leu Phe Arg Asn			
115	120	125	
Gly Arg Phe Asn			
130			

<210> 189
<211> 132
<212> PRT
<213> Bovine

<220>
<223> Cow interleukin-13 sequence

<400> 189

Met Ala Leu Leu Leu Thr Ala Val Ile Val Leu Ile Cys Phe Gly Gly			
1	5	10	15
Leu Thr Ser Pro Ser Pro Val Pro Ser Ala Thr Ala Leu Lys Glu Leu			
20	25	30	
Ile Glu Glu Leu Val Asn Ile Thr Gln Asn Gln Lys Val Pro Leu Cys			
35	40	45	
Asn Gly Ser Met Val Trp Ser Leu Asn Leu Thr Ser Ser Met Tyr Cys			
50	55	60	
Ala Ala Leu Asp Ser Leu Ile Ser Ile Ser Asn Cys Ser Val Ile Gln			
65	70	75	80
Arg Thr Lys Lys Met Leu Asn Ala Leu Cys Pro His Lys Pro Ser Ala			
85	90	95	
Lys Gln Val Ser Ser Glu Tyr Val Arg Asp Thr Lys Ile Glu Val Ala			
100	105	110	
Gln Phe Leu Lys Asp Leu Leu Arg His Ser Arg Ile Val Phe Arg Asn			
115	120	125	
Glu Arg Phe Asn			
130			

<210> 190
<211> 131
<212> PRT
<213> Canis C. lupus

<220>

<223> Dog interleukin-13 sequence

<400> 190

Met Ala Leu Trp Leu Thr Val Val Ile Ala Leu Thr Cys Leu Gly Gly
1 5 10 15
Leu Ala Ser Pro Ser Pro Val Thr Pro Ser Pro Thr Leu Lys Glu Leu
20 25 30
Ile Glu Glu Leu Val Asn Ile Thr Gln Asn Gln Ala Ser Leu Cys Asn
35 40 45
Gly Ser Met Val Trp Ser Val Asn Leu Thr Ala Gly Met Tyr Cys Ala
50 55 60
Ala Leu Glu Ser Leu Ile Asn Val Ser Asp Cys Ser Ala Ile Gln Arg
65 70 75 80
Thr Gln Arg Met Leu Lys Ala Leu Cys Ser Gln Lys Pro Ala Ala Gly
85 90 95
Gln Ile Ser Ser Glu Arg Ser Arg Asp Thr Lys Ile Glu Val Ile Gln
100 105 110
Leu Val Lys Asn Leu Leu Thr Tyr Val Arg Gly Val Tyr Arg His Gly
115 120 125
Asn Phe Arg
130

<210> 191

<211> 131

<212> PRT

<213> Rat

<220>

<223> Rat interleukin-13 sequence

<400> 191

Met Ala Leu Trp Val Thr Ala Val Leu Ala Cys Leu Gly Gly
1 5 10 15
Leu Ala Thr Pro Gly Pro Val Arg Arg Ser Thr Ser Pro Pro Val Ala
20 25 30
Leu Arg Glu Leu Ile Glu Glu Leu Ser Asn Ile Thr Gln Asp Gln Lys
35 40 45
Thr Ser Leu Cys Asn Ser Ser Met Val Trp Ser Val Asp Leu Thr Ala
50 55 60
Gly Gly Phe Cys Ala Ala Leu Glu Ser Leu Thr Asn Ile Ser Ser Cys
65 70 75 80
Asn Ala Ile His Arg Thr Gln Arg Ile Leu Asn Gly Leu Cys Asn Gln
85 90 95
Lys Ala Ser Asp Val Ala Ser Ser Pro Pro Asp Thr Lys Ile Glu Val
100 105 110
Ala Gln Phe Ile Ser Lys Leu Leu Asn Tyr Ser Lys Gln Leu Phe Arg
115 120 125
Tyr Gly His
130

<210> 192

<211> 131

<212> PRT

<213> Mus Musculus

<220>

<223> Mouse interleukin-13 sequence

<400> 192

Met	Ala	Leu	Trp	Val	Thr	Ala	Val	Leu	Ala	Leu	Ala	Cys	Leu	Gly	Gly
1															15
Leu	Ala	Ala	Pro	Gly	Pro	Val	Pro	Arg	Ser	Val	Ser	Leu	Pro	Leu	Thr
															20
Leu	Lys	Glu	Leu	Ile	Glu	Glu	Leu	Ser	Asn	Ile	Thr	Gln	Asp	Gln	Thr
															35
Pro	Leu	Cys	Asn	Gly	Ser	Met	Val	Trp	Ser	Val	Asp	Leu	Ala	Ala	Gly
															50
Gly	Phe	Cys	Val	Ala	Leu	Asp	Ser	Leu	Thr	Asn	Ile	Ser	Asn	Cys	Asn
															65
Ala	Ile	Tyr	Arg	Thr	Gln	Arg	Ile	Leu	His	Gly	Leu	Cys	Asn	Arg	Lys
															85
Ala	Pro	Thr	Thr	Val	Ser	Ser	Leu	Pro	Asp	Thr	Lys	Ile	Glu	Val	Ala
															100
His	Phe	Ile	Thr	Lys	Leu	Leu	Ser	Tyr	Thr	Lys	Gln	Leu	Phe	Arg	His
															115
Gly	Pro	Phe													130

<210> 193

<211> 125

<212> PRT

<213> Meriones (rodent)

<220>

<223> Gerbil interleukin-13 sequence

<400> 193

Met	Ala	Leu	Trp	Leu	Thr	Ala	Val	Leu	Ala	Leu	Ala	Cys	Leu	Ser	Gly
1															15
Leu	Ala	Val	Pro	Gly	Pro	Val	Gly	Arg	Ser	Val	Ser	Pro	Pro	Val	Ala
															20
Leu	Lys	Glu	Leu	Ile	Glu	Glu	Leu	Ser	Asn	Ile	Thr	Gln	Asp	Gln	Arg
															35
Thr	Pro	Leu	Cys	Asn	Gly	Ser	Met	Val	Trp	Ser	Val	Asp	Leu	Ala	Ala
															50
Gly	Gly	Phe	Cys	Ala	Ala	Leu	Asp	Ser	Leu	Thr	Asn	Ile	Ser	Ser	Cys
															65
Asn	Thr	Ile	Gln	Lys	Thr	Gln	Arg	Ile	Leu	Asn	Gly	Leu	Cys	Ala	Arg
															85
Lys	Ala	Pro	Ala	Val	Val	Ser	Arg	Val	Pro	Asp	Thr	Lys	Ile	Glu	Ala
															100
Ala	Gln	Phe	Ile	Lys	Asn	Leu	Leu	Asn	Tyr	Ser	Lys	Gln			
															115
															120
															125